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Why don't Small and Medium Enterprises Innovate More: Creating a Cooperative Learning Environment at Individual, Firm and Regional Level

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Abstract

One would expect, that a large number of innovations linked to cycle, a common person's means of transport, would be of great interest to the cycle industry. But, if the leaders of cycle industry do not evince much interest, there must be some serious reasons. It seems that if a company can manage growth with existing product range, why should it try to provide additional features or conveniences to the client. Indian small and medium scale industry appears to suffer from this limitation.

I propose that cooperative model of learning is evolved to make each enterprise more competitive. Thus, cooperation in learning space and sometimes in market space may make Indian industry more competitive globally. There is a brief reference to the potential of intellectual property rights database as a source of learning. Why even in crops like psyllium, Indians have hardly five out of 878 patents is an issue that needs careful attention. Incidentally, psyllium is grown only in India.

Why don't small and medium enterprises innovate more : Creating a cooperative learning environment at individual, firm and regional level[1]

Anil K Gupta[2]

In a globalising economy, regional or national benchmarks do not suffice any more. Be it technology or business method or practices, Indian small scale entrepreneurs will have to benchmark their current status in this regard with the best in the world. This is not going to be easy. How can innovations help in not only surpassing the existing benchmarks but also creating the new ones? In this paper, I want to discuss how culture of cooperation can reinforce the capability to compete at the firm and the network level. The classical contribution by Charles Perrow had shown the potential of the idea of cooperation among competing enterprises as a basis of regional revitalization in south Italy and several other parts of the world.

There are many challenges that Indian entrepreneurs face, the biggest among these is to become a 'learning and sharing' organisation. To become a learning organisation, one has to recognise that innovations take place at all levels within and outside the firm. The transaction cost of learning about these innovations, in fact, decline with every attempt to learn, experiment, assimilate and institutionalize the lessons of the relevant innovations. Even those innovations which may not appear relevant at one time may become relevant at another time. In any case more than the tangible aspects of innovations, it is the intangible aspect of the process, the heuristic and the spirit underlying innovations which needs to be learnt from. But learning can cause temporary setback, threat and sometime the feeling of disappointment. After all who would like to believe that he/she may have missed some of the obvious lessons or creative ideas which occurred to people of firms with lesser endowment, scale or even success. Therefore, it is not easy for a giant, say in cycle industry to recognise that she may have missed large number of innovations (which

[1] Slightly modified version of talk delivered at Ludhiana Management Association, organised by Department of Business Management, Punjab Agricultural University, Ludhiana, on 19th October 2005

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I will talk about) in the industry or more importantly, in the informal sector by grassroots innovators. But, once it is recognised that these innovations have potential, the learning cycle needs to be shortened and cost of possible errors in trying new ideas be budgeted.

I do not know how many firms have a black or white board in their workshops or manufacturing plants. How else can a worker or supervisor go and share the ideas or improvements that may be bubbling in their minds. I have not come across many shop floors having a mechanism where problems being faced or innovations being found or shared, debated, fought over are celebrated.

Let me first discuss some general lessons about learning at firm, network and industry level. I will then take examples from grassroots innovations and technological changes in different sectors to demonstrate the potential that exists for learning from informal sector and processes. Lastly, I will talk about competitiveness with countries like china and Vietnam with whom also, we should learn to cooperate as well as compete. I will also refer to some of the studies done at IIMA on the role of intellectual property in generating competitive advantage with particular reference to agriculture and biotechnology.

Part One: Lessons for learners at firm, farm, network and industry level

The major barriers to learn at individual or firm level are (Gupta, 1984):

I. Individual level

a. My learning is not enough, others must also learn
b. The rewards from learning are not sure and insufficient
c. What will others say, if I fail or don't succeed
d. So many have tried before, can I really bring about the change
e. Who cares whether I learn or not
f. How will I admit (particularly to my juniors and peers) that I did not know even this much
g. Don't I already know enough
h. How do I see connections among things which are not connected in my existing view
i. How can I learn from someone who knows so little or who has not done so well in fields in which I excel (as if one can only learn from super performers)

The inertia, inhibition, arrogance and unwillingness to recognise the timidity underlying one's resistance to learn, are thus dominant forces coming in the way of learning. A very simple test to check how well one is doing in this regard is to write on a piece of paper every week, five lessons one learnt from children, colleagues (junior as well as senior), family members, strangers and from one's own conduct apart from reading and listening. If it is difficult to recall even one or two examples, we have some task to do. Sometimes, learning is lost not because we did not realize the worth of an idea. But, because, we did not classify it properly or link it with something else that we knew already.

When it comes to economic activities, some of these lessons translate in different forms at the firm level:

II. Firm level

a. Why will somebody tell me answers to a problem I am facing when he/she is my competitor
b. What is the point in benchmarking, I know what are the best practices and have been using them all
c. Have not I made all the money I did without benchmarking for so long; why do I need to change now
d. I don't think reasons which made me succeed can be the responsible for my failure
e. How can somebody with much less qualification, experience and knowledge teach me about how to do things better
f. It does not really matter how well I listen to my peers or colleagues so long as I work hard and sincerely
g. Where is the need to catalogue key learnings made in different sections of the firm, would not new staff learn over time? So what if some time and energy is lost in the process
h. Lakshman can learn from Ravan but I cannot learn from those I don't respect; the hurts must live in heart, lest they are dissolved to generate a possibility of learning from those one does not like

i. I can pay for doctor, architect or travel agent but not to an expert to diagnose my manufacturing practices or my business methods to suggest improvements

Many of these issues are relevant for any organisation and not just a business organisation. Though, the implications of not learning are far more costly for a business organisation than perhaps others.

III. Regional level:

a. If everybody becomes efficient in the cluster, would not my profits be affected adversely
b. Our competition is with each other within a cluster or region rather than with the bigger competitors globally
c. What is the point in tracking patents and other technologies in our field when we cannot afford to do R&D at the level at which the big companies can do
d. How can innovations in a small firm be important enough to be patented; would it not be better to keep them as trade secret
e. How can we acquire some of the basic costly technologies cooperatively rather than individually; why would other cooperate in modernising if the comparative advantage of modernisation would not be seen to different firms in the same industry
f. While USA can outsource to India, we should try to do as many things as possible within the firm; what is the use therefore to make a calendar of under utilised capacities in a cluster or in an industry

The fact that every competing firm does not compete in all aspects of its functioning is seldom recognised enough. There is no doubt that there is tremendous amount of goodwill and 'bhai chara' among small scale entrepreneurs, this seldom translates into institutionalised learning strategies. It is not realised that with increasing complexity of technology involved in various industries, the cost of upgradation, innovation or assimilation may not always be affordable by a firm at individual level. A group action may become inevitable. Likewise, when it comes to testing, calibrating or managing

environmental standards, cooperative action is inevitable for creating relevant infrastructure.

Given this context, the problems in learning can indeed be overcome slowly and slowly at all the levels and new models of doing business can emerge. Several small scale industries in the machine tool sector in Gaziabad and Bangalore had formed a common marketing company viz., Micromatic Machine Tools. Although they competed with each other in several respects, they also cooperated at the same time. In garment industry, when a large order is received, several small firms join hands and become partners or a kind of department of the firm receiving order. Once the order is completed, they start competing with each other again. Therefore, competition and cooperation can also follow in cycles. The current economic environment is generally very favourable for promoting *small firm networks* around technologies and product portfolios to improve competitive advantage. Chinese have mastered this art and therefore their toy industry could decimate the Indian industry almost completely. They anticipated the needs of each niche market before every festival and responded to it through cooperative action. Certain quality control measures or machineries for testing may not be affordable at individual firm level. Collective action is almost mandatory.

Part Two: Lessons from innovations in informal sectors

National Innovation Foundation (NIF) has scouted more than 50000 grassroots innovations and traditional knowledge practices from over 400 districts with the help of Honey Bee Network collaborators and others. Many of these have high potential for commercialisation by the small and medium scale entrepreneurs through exclusive or non-exclusive licenses. There is no doubt that innovative potential will be no less among the SSIs also. However, no systematic effort has been made to survey such innovations in a concerted manner.

Competitiveness without innovation is not possible. A small firm has five choices in this regard: (a) to innovate itself, (b) to acquire or license innovation by others and (c) to jointly develop innovation with a formal or informal R&D person/institution (d) contract out the tasks to professional product developer or innovator and (e) sponsor a student project. We can ask ourselves as to what has been our experience in this regard. Let me first take the example of innovations by grassroots innovators and then explore the

dimensions of collaboration between the firms and the grassroots innovators through GIANs (Grassroots Innovation Augmentation Networks) or NIF.

Bicycle is one such thing which most common people in the villages and the cities can afford. It is true that bicycle industry has never lobbied for cycle lanes on the roads within or between the cities. In China, almost one third to one fourth road is earmarked for cycles in most small or big towns. For them cycle is part of their future. For us, it is something to be lived with, though millions of people survive through this technology. What are the key innovations that have come about in the form, features or functions of cycles in the last half a century? Not many. Why is it that Indian user of cycle has not been seen as a co-inventor or developer of various choices that manufacturers could offer. In NIF database, cycles have been used for pumping water from the well or river or tank, spraying pesticides, drilling, sawing and performing other mechanical operations, for grinding vegetables, extracting juice, sprinkling water, etc. In addition, cycles have been developed which reduce drudgery and convert vertical motion generated by bumps on the road into horizontal energy for propelling rear wheel. When we cannot improve the condition of the rural or urban roads, thanks to Kanakdas from Assam, we can use the bumps on the road for generating energy. Similarly, he also developed a cycle which used the bumps to charge the battery which in turn was used to propel the cycle. This 'e-bicycle' is an interesting concept which can make reduce the drudgery. Some models of this kind indeed exist. Saidullah developed a cycle which runs in water as well as on road. It can be used as a source of entertainment in various water parks, irrigation channels, ponds, etc., and also used for removing aquatic weed or vending provisions along the perimeter of the lake in eastern India. Why would not cycle manufacturers see business opportunities in these ideas and innovations? May be some of the reasons mentioned earlier explain the inertia or inhibition.

Imagine you are in a crowded market and your cell phone battery is low. How will you charge your cell phone? Either you use one of the Chinese devices which help in charging cell phone by using normal AA batteries or use a hand wound generator or have a small micro windmill installed in your cap. When you run, the windmill will charge the batteries. But you could do something else. There could be vendors having cycle attached with charging racks as witnessed at the airports. And they would charge cell phones for a few rupees. You have generated a new job at a low cost. There are

umpteen applications for which cycle can be a wonderful device. Millions of people are going to be provided jobs under employment guarantee scheme. A large number of them will break stones; make roads which will be washed away in the first rain bringing us back to the square one. Why not cycle based battery charging stations could be created in rural areas as a part of employment guarantee schemes? Using LED as a source of light, one can reduce wattage for generating light for reading and other purposes and transform the educational environment for children and improve quality of life. Cycle can be modified to provide small shafts and pulleys to run a whole range of crafts, repair workshop and other activities. Some people do it on their own. But, there is no organised effort to add a whole range of features for consumers to use.

What I have tried to suggest is that pedal power is a very important source for even running computers in some part of the world. But in India, we have not innovated enough. Why should we leave the innovation space for others when we can easily fill that with our own creativity?

One can take example of the sprayers, micro electronics, and other devices. No multi national company offers an attachment by which you can use your cell phone to switch and off various devices at home, in office or in farm. Prem Singh, class X drop out developed a mechanism for remote operation of a tube well. One could switch it on or off from anywhere in the world. If somebody went on a vacation and forgot to switch off the lights or other points, with this device he could do that wherever he/she is. There are large numbers of applications for remote management which will become possible with this device. Prem Singh still struggles to find an entrepreneur who will take his ideas to market so that he could continue with R&D, a task that he enjoys most. Award from NIF has increased the frustration of such innovators. They now know that their ideas matter and yet are not able to generate revenue by commercialising the same. This is a frustration that we also share. But, may be it is not going to last. There is indeed a hope which lies in our overcoming barriers to learning at individual, firm or regional level.

Part Three: Lessons from other sectors and way forward

There are at least 400,000 technology students in the country. Each one of them does a project which often does not see the light of the day. It remains buried somewhere. Students lose interest after passing out and their faculty members move on to new ideas.

There is no record, no database, no website and therefore no opportunity for entrepreneurs to see whether some of these projects could be worth taking forward. Why could not association of small scale industries join hands with technology and business schools in their region and help in building such a database. Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) can help in coordinating such efforts and link all such databases with indiainnovates.com. Once the database comes into being, the transaction costs of the students to learn from each other as well as of the entrepreneurs who might like to take these ideas forward, will come down.

In addition, the SSIs and SMEs can also sponsor projects to be done by the students. Even if one per cent projects solve a real life problem of small entrepreneurs, 4000 problems will get solved every year.

There are many other databases which entrepreneurs have to use to become competitive in knowledge economy. I will refer to one more such database with specific reference to agriculture and biotechnology. It is well known that all the patents granted world over are available on the web free of cost. Those patents who life has expired or which are not being maintained, are available for use without any licence fee. Even those patents which have not been filed in India can be drawn upon without any problem since the restrictions are applicable only within the country in which the patents have been granted.

Let us see two examples of crops which grow widely in India. Psyllium, or isabgul which is only grown in India. In table 1 to 4, we can look at the patents granted to citizens of different countries, for different purposes, assigned to different companies or individuals. Out of more than 878 patents, just four are by Indians. How can farmers get better price and entrepreneurs get more business opportunities if we will remain confined to the lowest part of the value chain i.e., the primary production? This is one area whether other countries and companies have shown tremendous imagination and at the same time we have shown our apathy.

If companies in USA have 667 patents out of these, they see an opportunity which we have missed. Let us look at another crop viz., castor in which India has a very large share of the world market. Is situation any different? No. What is more remarkable in this case is that more than 45 per cent patents on various uses of this crop are for

pharmaceutical purposes. How many agricultural universities have active departments for nutraceuticals and/or herbal drugs and other such value added products? Why would not industry put pressure on public R&D institutions to reform and rather fast. At the same time, industries should set up cooperative R&D centres where review of patent databases will be an every day activity. Unless innovations become the driver of change, agriculture and industry will not link up productively and the value gains will not increase.

Large number of value added products in agriculture require biotechnology applications. What is most noteworthy about biotechnological opportunities is the fact that same equipment can be used; produce a very wide variety of products. Be it microbial diversity or modified crops or new industrial applications based on biological materials, the opportunities are immense. The fixed cost investments in biotechnology are also not very high compared to many other sectors. The industrial biotechnology will require new departments combining engineering, electronics, biotechnology and even medicine. Such realignment of academic sectors will require pressure from farmers as well as firms.

I hope that the SMEs and SSIs will recognise that even if each one of them cannot afford to spend a great deal of money on R&D, they can do so collectively and also through partnership with public sector R&D and technology institutions. The institutional reform in agricultural universities and other technology institutions is long overdue. CSIR explains one third of the total patents filed by Indians in US in the last few decades. And more than 80 per cent have been filed in the last decade. Compare that with all the universities which have hardly 2½ per cent share. The share of agricultural universities is almost zero.

Let me conclude by submitting that Indian small-scale industries have a tremendous potential for challenging the existing giants by networking, collaborating and innovating. All of this will require change in the mindsets. Chinese have progressed so fast because they could assimilate new technologies, create networks and develop extraordinary supply chains very rapidly. The institutional arrangements including the progress of incubators set up in collaboration with technology institutions have been also very buoyant. India has a much stronger R&D base but much weaker industrial linkages. The farmers have even lesser say in the design of research programmes and reorganisation of research institutions. I hope that through partnership between public and private

entrepreneurship, R&D infrastructure and above all, involvement of the users themselves, we can transform the rate of economic growth and pattern of its social, environmental and technological impacts.

The youth needs to be challenged and entrepreneurs need to overcome the barriers to learning at various levels. I have deliberately not mentioned much about government because I don't expect changes in that system very fast. The bureaucratic stranglehold on the infrastructure for imagination is not getting loosened fast enough. It will, once the entrepreneurs perform and create pressure. There is no pressure more effective than that of performance. But, sometimes even that fails to stir the conscience of the system. Otherwise, how do we explain so many problems that common people face and for which solutions are still eluding us. The large database of innovations compiled by NIF shows just the tip of the iceberg. I don't believe that knowledge rich, economically poor people are the bottom of the pyramid. In fact, as I have shown, many of them are the top of the innovation and imagination pyramid. It is we, the professionals and the entrepreneurs and of course, the policy makers, who are often at the bottom of the learning pyramid. Let us invert our pyramid and build horizontal, mutually respectful and collegial linkages for learning among entrepreneurs in formal and informal sectors.

Table 1

PATENTS GRANTED FOR VARIOUS USES OF PYSLLIUM AT USPTO BETWEEN 1976 – OCT. 2, 2005. N= 878

Sr.	Purpose	Patents
1.	**Drug, bio-affecting and body treating compositions :** diarrhea, cancer, gelatin capsule, anti-allergic, hypercholesterolemia, diet pills, anti-inflammatory, immuno-stimulating, reduce blood cholesterol, treating nocturnal angina, anti-androgenic agent, decongestant, treating mastitis, wound, bowel dysfunction, bronchial provocation test, protection against pregnancy, neurological, cardiac, coating tablet, bio availability, controlled tobacco (e.g. nicotine) habit, skin ointment, toothpaste, herbal, analgesics, Alzheimer's disease, nutraceuticals, Parkinson's disease, arthritis and other afflictions, etc.	**464**
2.	**Food or edible material :** decontamination, balanced food composition, beverages, snacks, chewy confectionary, polysaccharide breadcrumb, caffeine replacement composition, antifreeze protein, food decoration, confectionary, dietary additives, pasta product, dog biscuit, nutritional, pet food, grain products, vitamin fortified drink, etc.	**181**
3.	**Plant protecting and regulating compositions :** pesticide, herbicide, herbicide soap, growth promoter, growth regulant composition, photodynamic, metabolism, fruit production, etc.	**77**
4.	**Composition : coating and plastics :** fluids, electro-rheological fluid, organic binder, erasable inks, flavourants, fragrances, wash active composition, metallic ink composition, shear thinning additive, graphite particles, biodegradable, tone pigment, seed gum , cement composition, electronic applications, dispersible polymers, aqueous ink, pectin powder coating, polymer composition, etc.	**36**
5.	**Organic compounds :** non gelling, research and diagnostic applications, elective extraction, purification of mucilaginous polysaccharides, etc.	**18**
6.	**Chemistry: molecular biology and microbiology :**cultured plant cell gum, oil, gas well drilling, lithography, adhesive, screening assays, leukocyte adhesion deficiency, germ cell, embryo survival, standardization medium, allergens, biologically active support, assaying blood serum, etc.	**15**
7.	**Synthetic resins or natural rubbers :** synthetic composition, ink, polychromic, water based composition, polyol polyester polymer, soluble polymer, biodegradable polymer films and sheets, tone pigment, etc.	**12**
8.	**Cleaning compositions :** fabric care, detergent, biopolymer thickening agent, laundry colour and care, emulsion, etc.	**7**
9.	**Plant husbandry :** soil stabilization, seed enhancement, artificial mulch, etc.	**7**
12.	**Other Uses :** adhesive bonding ,miscellaneous chemical manufacture, ammunition and explosives, paintball grenade, animal husbandry, clumping materials, agglomerating liquid, organic debris, catalyst, sorbent, fumigants, sanitizing materials, diagnostic assay, vermin-compost, fertilizer, paper products, natural gum, anti-settling additive, heat-storing material, thermal radiation surface, absorbent material, nutrient clusters, fluorinated hydrocarbons, cellulosic product, strength additives, pelletizing mineral material, starch base binder, herbal snuff, gelling agent, right mesh size, etc.	**51**

Table 2

PATENTS GRANTED TO INVENTOR FROM DIFFERENT COUNTRIES ON VARIOUS USES OF PSYLLIUM FROM OCT.1985 TO 2nd OCT. 2005 AT USPTO

Sr. No.	COUNTRY	PATENTS GRANTED
1	USA	663
2	Germany	57
3	Japan	49
4	UK	24
5	Canada	13
6	France	13
7	Netherlands	9
8	Australia	6
9	Israel	6
10	Switzerland	5
11	India	4
12	Ireland	4
13	Italy	4
14	Korea	3
15	Belgium	3
16	Hong Kong	3
17	Spain	2
19	Others	10
TOTAL PATENTS		878

Table 3

PATENTS TO ASSIGNEES FROM DIFFERENT COUNTRIES ON DIFFERENT USES OF PSYLLIUM AT UNITED STATES PATENTS AND TRADEMARK OFFICE
FROM OCTOBER, 1985 – 2nd OCTOBER, 2005

Sl. No.	COUNTRY	PATENTS GRANTED
1	USA	667
2	Germany	64
3	Japan	48
4	France	12
5	UK	12
6	Luxembourg	9
7	Australia	7
8	Ireland	7
9	Switzerland	7
10	Israel	6
11	Netherlands	5
12	India	4
13	Italy	4
14	Spain	4
15	Korea	3
16	Sweden	3
17	Belgium	2
18	Denmark	2
19	Hong Kong	2
20	Others	10
TOTAL PATENTS		878

Table 4

TOP ASSIGNEE CORPORATIONS THAT HAVE BEEN GRANTED PATENTS ON VARIOUS USES OF PSYLLIUM AT USPTO BETWEEN OCT. 1985 – 2nd OCT. 2005

Sr.No	ASSIGNEE CORPORATIONS	PATENTS GRANTED
1	The Procter & Gamble Company	76
2	Warne – Lembart Company	24
3	Bayer Aktiengesellschaft	21
4	General Mills Inc.	20
5	E.I.Du Pont de Nemours and Company	18
6	Kellogg Company	18
7	Medinox Industries	13
8	The iams Company	15
9	Abbort Laborateries	11
10	Alza Corporation	11
	Individuals	118
	Others	553
	TOTAL PATENTS	878